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L56 ANSWER 1 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2005-607561 [63] WPIX Full-text
DNC C2005-183032 [63]
DNN N2005-498172 [63]
TI Monitoring and measuring the **volume** of a **liquid** **droplet discharged** from a **liquid** **dispensing** system, comprises using a **liquid** to form part(s) of three components of a **capacitor**
DC B04; D16; P42; S02
IN **FRANKEN C**; **MAKAROV S**; **OSING J**; **SHVETS A**; **SHVETS I**
PA (ALLE-N) ALLEGRO RES LTD; (FRAN-I) FRANKEN C; (MAKA-I) MAKAROV S; (OSIN-I) OSING J; (SHVE-I) SHVETS A; (SHVE-I) SHVETS I
CYC 37
PIA EP 1568415 A2 20050831 (200563)* EN 27[14]
US 20050223814 A1 20051013 (200567) EN
ADT EP 1568415 A2 EP 2005-394006 20050223; US 20050223814 A1 **US 2004-787229 20040227**
PRAI **US 2004-787229 20040227**

AB EP 1568415 A2 UPAB: 20051223

NOVELTY - Monitoring and measuring the **volume** of a **liquid droplet discharged** from a **liquid dispensing** system comprises measuring an electrical property arising form the separation of the **droplet** from the **nozzle**, using the **liquid** to form part(s) of the three components of the **capacitor**, and measuring the change in **capacitance** in the **capacitor** as the **liquid** is **discharged** from the **nozzle.**

DETAILED DESCRIPTION - Monitoring and measuring the **volume** of a **liquid droplet discharged** from a **liquid dispensing** system comprises measuring an electrical property arising form the separation of the **droplet** from the **nozzle** (5), using the the **liquid** to form part(s) of the three components of the **capacitor**, and measuring the change in **capacitance** in the **capacitor** as the **liquid** is **discharged** from the **nozzle**, thus the **volume** of **liquid dispensed** and termination of **discharge** may be recorded. The three components of the **capacitor** is a **dielectric**, and two separate electrically **conductive** mechanisms. The **liquid dispensing** system comprises a **nozzle** with **dispensing** tip (7). An INDEPENDENT CLAIM is included for a **liquid droplet** monitoring and measuring apparatus (1) for a **droplet dispenser** of a type comprising a **nozzle** with a **dispensing** tip, a mechanism for delivering the **liquid** under pressure through the **nozzle** onto a receiving substrate, an electrically **conductive** mechanism, a mechanism for mounting the electrically **conductive** mechanism adjacent the **dispensing** tip, mechanisms for electrically energizing the **liquid** with alternating current, and a mechanism for measuring the change in **capacitance** between the electrically **conductive** mechanism and **liquid droplet** as the **liquid droplet** is formed on and subsequently detached from the **dispensing** tip.

USE - For monitoring and measuring the **volume** of a **liquid droplet discharged** from a **liquid dispensing** system (claimed).

ADVANTAGE - The invention provides comfort even if the **dispenser** functions properly as the user cannot satisfy him/her in this by simple visual monitoring. It eliminates **drop** to contact with measuring device.

DESCRIPTION OF DRAWINGS - The figure shows a diagrammatic representation of **liquid** monitoring and measurement apparatus. **Liquid droplet** monitoring and measuring apparatus (1)

Outer shield (3)

Nozzle (5)

Dispensing tip (7)

Electrode (11)

Preamplifiers (16)

Low pass filter (19)

Signal conditioning amplifier (20) Signal read out device (21)

TECH

MECHANICAL ENGINEERING - Preferred Methods: The method includes electrically energizing the **liquid** with alternating current and measuring the **capacitance** induced in the electrically **conductive** mechanism sited adjacent the tip as the **liquid** is **discharged** from the **nozzle.** The method comprises sitting the **nozzle** in the **conductive** chamber with an outlet to allow the passing of **liquid** through it from the **nozzle dispensing** tip, energizing the **liquid** by applying voltage at preset carrying frequency, and measuring **capacitance** induced by the interaction of **liquid** and chamber until the **liquid** detaches from the **nozzle.** The initial calibration step is performed by **dispensing** initially **droplets**, measuring the change in **capacitance**, weighing the **droplets**, and storing data for subsequent use, measuring change in **capacitance** caused by jet immediately before and after the formation of **droplet** to determine the **volume** and other characteristics of **droplet.**

Preferred Components: The **liquid droplets** forms electrically **conducting** mechanism of the **capacitor.** The **liquid** and **nozzle** are high electrical **conductivity.** An electrode (11) is provided remote from and beneath the **nozzle.** The **nozzle** and electrode form plates for the **capacitor**, thus the growth of **droplet** on the **dispensing** tip increases the **capacitance** until it **drops** on detachment of the **droplet** from the **dispensing** tip. The **liquid droplet** forms a **dielectric** mechanism positioned in the vicinity of electrically **conducting** mechanism of the **capacitor** and alternates the effective **dielectric** constant of the **capacitor.** The **liquid** is electrically non-**conductive.** The **liquid** is a water based **liquid.** The **liquid** is energized at a frequency of 100 KHz-5MHz. The **liquid** is energized with alternating and direct current. The **volume** of the **liquid** is calculated from the change in **capacitance** and charge carried by the **liquid droplet.** When the variance between the calculated **volumes** exceeds a preset amount, a possible malfunction is recorded. The **liquid** is delivered form the **nozzle** in a continuous jet. The jet forms separate **droplets** remote from the **dispensing** tip while still maintaining the jet. The information on the characteristic of **droplets** is used to control the manner where the jet is formed. The **liquid** is not **discharged** from the apparatus. The **capacitance** is measured and monitored to provide an indication of possible leak in the apparatus on change in **capacitance** detected. The mechanism for energizing the **liquid** is radio frequency oscillator. The electrically **conductive** mechanism comprises a cylindrical chamber. The electrically **conductive** mechanism comprises an open ended sleeve with a entrance for reception of a **nozzle** and exit for **discharge** of a **droplet** . The **nozzle** is electrically **conductive.** The electrically **conductive** mechanism is mounted beneath the **dispensing** tip and spaced-apart from it. The apparatus comprises an additional direct current source for energizing the **liquid** with direct current and a mechanism for sensing when the **droplet** exits the apparatus. The electrically **conductive** mechanism is a **capacitor.** The **capacitor** is formed from two spaced apart electrically **conductive** plates.

L56 ANSWER 2 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **2005-243287** [26] WPIX Full-text
DNN **N2005-200218** [26]
TI **Liquid drop** measuring method and device
DC S02; T01
IN LI B; SHEN T; ZHANG T
PA (UYSH-N) UNIV SHANGHAI
CYC 1
PIA CN 1558187 A 20041229 (200526)* ZH [0]
ADT CN 1558187 A **CN 2004-10016262 20040212**
PRAI **CN 2004-10016262 20040212**
AB CN 1558187 A UPAB: 20050709

NOVELTY - The present invention relates to one kind of **liquid drop** measuring method and device. The measurement method includes adopting two vertically superposed position sensors and one **capacitive** sensor to measure the time for the **liquid drop** to pass through, adopting a frequency counter to count frequency and adopting microprocessor to calculate the **liquid drop volume.** The device includes two photoelectronic sensors, one **capacitive** sensor, one **capacitance** /frequency converter, one frequency pulse counter and one

microprocessor. The present invention can measure the **volume** of each falling **liquid drop** directly with high precision and fast dynamic speed.

L56 ANSWER 3 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2004-033953 [03] WPIX Full-text
DNC C2004-011148 [03]
DNN N2004-027002 [03]
TI Modifying electrodes in array of electrodes by binding respective probe molecule to electrodes to be modified, dissociating respective probe molecule from electrode and contacting each electrode with respective **liquid**
DC B04; D16; S02; S03
IN KUNWAR S; MATHAI G T; PISHARODY S; SCABOO K
PA (GENO-N) GENORX INC; (KUNW-I) KUNWAR S; (MATH-I) MATHAI G T; (PISH-I) PISHARODY S; (SCAB-I) SCABOO K
CYC 105
PIA US 20030224387 A1 20031204 (200403)* EN 34[11] <--
~~WO 2004061133~~ A1 20040722 (200448) EN
AU 2003300277 A1 20040729 (200477) EN
ADT US 20030224387 A1 Provisional **US 2002-382074P 20020522**; US 20030224387 A1 **US 2002-327868 20021226**; AU 2003300277 A1 **AU 2003-300277 20031222**; WO 2004061133 A1 **WO 2003-US41002 20031222**
FDT AU 2003300277 A1 Based on WO 2004061133 A
PRAI **US 2002-327868 20021226**
US 2002-382074P 20020522
AB US 20030224387 A1 UPAB: 20050527

NOVELTY - Modifying (M1) electrodes (I) in an array of electrodes involves overlying each of at least two electrodes (II) to be modified with a respective protective molecule (III), binding respective probe molecule to (II) and dissociating (III) from a electrode overlaid by a protective molecule and contacting each of electrodes in several subsets of (I) with a respective **liquid.**

DETAILED DESCRIPTION - Modifying (M1) electrodes (I) in an array of electrodes involves overlying each of at least two electrodes (II) to be modified with a respective protective molecule (III) such that (III) inhibits probe molecules from binding to the two electrodes, binding respective probe molecule to (II), and: (a) dissociating (III) from a electrode overlaid by a protective molecule and contacting each of electrodes in several subsets of (I) with a respective **liquid**, where each **liquid** comprises a respective different probe molecule, and an electrode is subjected to both steps of dissociating and contacting the respective different probe molecule of the respective **liquid** which binds to the electrode; (b) contacting several of (I) with a **liquid** (IV) and dissociating a protective molecule form one of the electrodes in contact with (IV) where the probe molecule of (IV) binds to the electrode which is subjected to contacting and dissociating steps; and (c) addressing one of (I) with a dissociation potential and contacting (I) with a **liquid** comprising a probe molecule or a protective molecule, where one of probe molecule and one of the protective molecule bind to the first electrode. INDEPENDENT CLAIMS are also included for the following: (1) modifying (M2) electrodes in an array of electrode pairs, where each electrode pair comprises a first and **second** electrode involves overlaying each of the first and **second** electrodes in a electrode pair with (III) such that (III) inhibits probe molecules from binding to the two electrodes, binding respective probe molecule to the first and **second** electrodes of the electrode pairs, dissociating a protective molecule form the first electrode of the electrode pair without dissociating a protective molecule form the **second** electrode of the electrode pair, and contacting the first and **second** electrode of the electrode pair in the array of electrode pair with a **liquid** comprising a first probe molecule, where the

first and **second** electrodes of the electrode pair being spaced apart by less than 1000 A and the first probe molecule of the **liquid** binds to the first electrode; (2) forming (M3) an electrical connection between first electrode and a **second** electrode of an electrode pair involves binding a first molecule to the first electrode where the first molecule comprises a first single stranded polynucleotide, binding a **second** molecule to the **second** electrode where the **second** molecule comprises an intercalating group configured to intercalates with double stranded polynucleotides, and contacting the electrode pair with a **second** single stranded polynucleotide at least partially complementary to the first polynucleotide, where the first and **second** polynucleotides form a duplex region and the intercalating group intercalates with the duplex region thus forming the electrical connection between the first and **second** electrodes; (3) preparing (M4) a sensor involves binding a first molecule to a first electrode, binding a **second** molecule to a **second** electrode, where if the first electrode pair is contacted with a **liquid** comprising a **second** single stranded polynucleotide sequence at least partially complementary to the first polynucleotide sequence, the first and **second** polynucleotide sequences will form a duplex region and the intercalating group will intercalate with the duplex region thus modifying an electrical characteristic of the first and **second** electrodes, thus the presence of the at least partially complementary polynucleotide may be determined;
(4) an apparatus (V) for preparing an array of modified surfaces comprising a device configured to contact electrodes of each of a number N subsets of electrodes an array of electrodes with a respective **liquid**, where each **liquid** comprises a respective different compound and N is an integer greater than 1 and for each subset of the N subsets of electrodes modify an electrical potential between at least a first electrode of the subset of electrodes and a reference electrode, thus the respective compound of the fluid contacting the first electrode binds to the first electrode; and (5) a sensor comprising a substrate which comprises a first electrode pair comprising first and **second** electrode, first molecule comprising first polynucleotide, bound with first electrode, and a **second** molecule comprising a group configured to intercalate with double stranded polynucleotide compounds, bound with **second** electrode.
USE - (M1) is useful for preparing sensors that are useful for detecting a wide range of macromolecules as well as macromolecules binding events.
DESCRIPTION OF DRAWINGS - The figure shows the top view of an exemplary biosensor.

TECH

BIOTECHNOLOGY - Preferred Method: In (M1), at least 2, 25 or 100 electrodes that are subjected to both dissociating and contacting steps are members of respective different subsets of electrodes. The contacting step is performed after dissociating step for some subsets in the several of the subsets of electrodes that comprise at least 2 or 5 member electrodes but fewer than 50 or 25 member electrodes. The dissociating step is performed while the subsets of electrodes are in contact with the respective **liquids** in the contacting step for at least some subsets in the several of the subsets of electrodes. Contacting step further comprises contacting each subset of a first portion in the several of the subsets with the respective **liquid**, while the subsets in the first portion of subsets remain in contact with the respective **liquids**, contacting each subset of a **second** different portion in the several of the subsets with the respective **liquid**.. While performing the contacting step, at least 25 or 100 of the subsets of electrodes in simultaneous contact with the respective **liquid** comprises a respective different molecule. The contacting step involves simultaneously contacting at least some subsets in the several of the subsets of the electrodes with the respective **liquid** where the respective **liquids** comprise at least two different **liquids**. The dissociating step involves modifying an electrical potential difference between the electrode and a reference electrode for

each electrode in several of the electrodes, thus a respective protective molecule dissociates from the electrode. The contacting step further involves contacting a respective, different reference electrode with the respective **liquid** for each of at least two subsets in the several of the subsets of electrodes, thus electrically contacting the electrodes in the subset of electrodes and the reference electrode or respective different reference electrode. The **liquid** used in contacting step does not electrically connect the subset with the respective reference electrodes of other subsets of electrodes. The contacting step further involves applying a **droplet** of **liquid** to the subset of electrodes and reference electrode where each **droplet** of **liquid** comprises a respective different probe molecules. (M1) further involves repeating the dissociating and contacting steps until a respective probe molecule is bound to each of at least 50 or 500 electrodes of the array. (M1) further comprises prior to performing the steps of dissociating and contacting, overlaying a several of the electrodes with a protective molecule by contacting the electrodes with a **liquid** comprising a protective molecule, where a protective molecule binds to electrodes of the array. The protective molecule is chosen from one of the alkylsiloxane, an alkanethiol containing 1-22 carbon atoms and a fatty acid. A respective protective molecule is bound to the each electrode in a several of electrodes, by a sulfur group. The probe molecules comprises a polynucleotide and a binding portion that binds the electrodes, where the polynucleotides bound to different electrodes have different sequences from one another and the binding portion comprising sulfur. The array of electrodes comprises a several of electrode pairs, where the first and the **second** electrodes of the electrode pairs in the array are spaced apart preferably by less than 500 A. The dissociating step comprises dissociating the a respective protective molecule from only the first electrode of the electrode pair where the electrode pairs belong to different subsets of the several of subsets of electrodes and the contacting step comprises contacting at least two electrode pairs with respective **liquids** comprising respective different probe molecules, where for each electrode pair of the two electrode pairs, contacted with respective **liquids** comprising respective different probe molecules where only the first electrode of the electrode pair is also subjected to the dissociating step, thus the respective different probe molecule of the respective **liquid** binds only to the first electrode, **second** electrode of the electrode pair, and contacting both electrodes of the electrode pair with a **liquid** comprising a probe molecule to be bound to the **second** electrode of the electrode pair, where the probe molecule to be bound to the **second** electrode is different form the probe molecule bound to the first electrode, and the probe molecule to be bound to the **second** electrode of electrode pair binds to the **second** electrode. The probe molecule bound to one of the first and **second** electrode comprises the first polynucleotide. The probe molecule bound to the other electrode comprises an intercalating group, where upon contacting the electrode pair with a **liquid** comprising a target polynucleotide at least partially complementary to the first polynucleotide of the probe molecule bound to the first electrode an electrical resistance between the first and **second** electrodes will be reduced. The dissociating step is performed without removing the **liquid** used in the contacting step, where the dissociating step comprises modifying an electrical potential of a electrode or modifying an electrical potential of a electrode and a reference electrode, thus a molecule dissociates from the electrode. (M1) further involves addressing a different electrode with a dissociation potential, contacting electrodes in the array with a **liquid** comprising different probe molecule, contacting electrodes

of the array with a **liquid** comprising a protective molecule, addressing a electrode in the array of electrodes with dissociation potential where one electrode that was subjected to addressing step and contacting step while not concurrently being subjected to addressing step and contacting step, contacting electrodes in the array of electrodes with a **liquid** comprising a different probe molecule and contacting electrodes in the array of electrode with a **liquid** comprising a protective molecule. The addressing step comprises modifying an electrical potential difference between a electrode and a reference electrode. The addressing step dissociates the protective molecule from the electrode. In (M2), the first probe comprises a polynucleotide or a phosphorothiolated polynucleotide. The **second** probe molecule comprises an intercalating group configured to intercalate with double stranded polynucleotides. In (M3), the **second** molecule comprises a **conductive** oligomer disposed intermediate the intercalating group and a **second** portion of the **second** molecule that is associated with the **second** electrode, where the **second** molecule is free of polynucleotides. The binding of the first and the **second** molecule to the first and the **second** electrode comprises binding a sulfur group of the first and **second** molecule to the first and **second** electrode, respectively. The intercalating group comprises ethidium bromide, acridine or a derivative of ethidium bromide or acridine. Prior to the step of binding the first molecule or **second** molecule to the first electrode or **second** electrode, overlaying the protective molecule upon the first electrode or **second** electrode, thus the protective molecule inhibits the association of first and **second** molecule with the first electrode or **second** electrode. The step of binding the first molecule or the **second** molecule to the first electrode or **second** electrode involves contacting the first and **second** electrodes with the **liquid** comprising the first molecule and modifying an electrical potential difference between the first electrode or **second** electrode and a reference electrode, thus protecting the first electrode or **second** electrode. Binding of the first molecule comprising respective different first polynucleotides to the first electrodes of respective different electrode pairs thus the first polynucleotide bound to different first electrodes will selectively from duplex regions with different **second** polynucleotides. The step of binding a first or **second** molecule to the first or **second** electrode involves contacting at least two subsets or number N subsets of the electrode pairs with respective **liquid** or respective different **second** molecule and modifying an electrical potential difference between the first electrode or **second** electrode of one of the electrode pairs and a reference electrode thus respective first molecule or **second** molecule binds to the first electrode or **second** electrode where N is an integer greater than one and less than Na. In (M4) contacting the subset with respective **liquid** involves applying aliquot of the respective **liquid** to the subset, where the electrode pairs of each subset of electrode pairs or isolated from aliquots of **liquid** applied to other subsets of electrode pairs. (M4) further involves determining an electrical characteristic such as **conductance**, resistance, an impedance or an **capacitance** of the first and **second** electrodes thus the presence of the **second** polynucleotide may be determined. The **second** molecule comprises a **conductive** oligomer disposed intermediate to the intercalating group and a portion of the **second** molecule that is bound to **second** electrode, where **conductive** oligomer comprises a saccharide and an aromatic group.

Preferred Apparatus: (V) is configured to repeatedly contact subsets of

surfaces in the array of surfaces with a respect **liquid** where each **liquid** comprises a respective different compound, and modify an electrical potential between the electrode in the subset of electrodes and a reference electrode until a respective different compound has been bound with each electrode in the array of electrodes. (V) further comprises several of **droplet** preparation devices, where each **droplet** preparation device is in fluid communication with a respective reservoir that comprises a respective one of the different compounds, and a **droplet** delivery device configured to deliver **droplets** prepared by the **droplet** preparation devices to predetermined subsets in the N subsets of electrodes, thus contact the predetermined subsets with respective **liquid.** The **droplet** preparation device comprises a capillary configured to prepare a **droplet** of fluid, where the **droplet** preparation devices are configured to prepare **droplets** by the thermally modifying pressure of the **liquid**, piezo-electrically modifying the pressure of the **liquid** and ultrasonically modifying a pressure of the **liquid.** The device is configured to bind one respective protective molecule to the electrodes of the array, where the respective protective compound inhibits association of the respective different compounds with electrodes. A sensor comprising. Preferred Sensor: The substrate comprises a number Na electrode pairs, each electrode pair comprising a first and **second** electrode pair, a first molecule bound with the **second** electrode, the first molecule comprising a first polynucleotide, a **second** molecule bound with the **second** electrode, the **second** molecule comprising a group configured to intercalate with double stranded polynucleotide compounds, and where upon contacting the electrode pair with a **liquid** comprising a **second** polynucleotide sequence at least partially complementary to the first and **second** polynucleotide sequences form a duplex region and the intercalating portion intercalates with the duplex region thereby modifying an electrical characteristic of the first and **second** electrodes where the presence of the at least partially complementary **second** polynucleotide may be determined. The different first polynucleotides are found with the first electrodes of respective different electrode pairs, thus the first polynucleotides bound to different first electrodes will selectively from duplex regions with different **second** polynucleotides.

ABEX EXAMPLE - Bare gold electrodes were cleaned by contacting the electrodes with a solution of 70% sulfuric acid and 30% hydrogen peroxide for one minute to remove organic surface contaminants. Each electrode within the array was protected by forming a self-assembled monolayer of a thiol containing compound on the electrodes. The self-assembled monolayers were prepared by exposing the electrodes of the array to an aqueous solution of 1 mM mercapto hexanol for 1-4 hours. Electrodes of the array were contacted with ethanol to remove any mercapto hexanol molecules which were not non-covalently bound to the electrodes. Electrodes of the array were addressed to deprotect individual electrodes by removing the mercapto hexanol. An electrode to be deprotected was contacted with an aqueous solution comprising 0.1 M potassium hydroxide for 100 seconds. A step voltage of -1.2 volts versus a reference electrode was applied to an electrode which was a silver/chloride electrode, although other reference electrodes may be used. Only electrodes addressed by modifying the potential difference between the electrode and the reference electrode were deprotected. Upon deprotecting an electrode, electrodes of the array were exposed to a **liquid** comprising a high ionic strength buffered solution of a thiol-terminated oligonucleotide for 1-4 hours. The thiol-terminated oligonucleotide reacted with the surfaces of electrodes that had been deprotected by desorbing the mercapto hexanol to form a self

assembled layer of the thiol-terminated oligonucleotide. Mercaptohexanol bound to electrodes that had not been deprotected inhibited adsorption of the thiol-terminated oligonucleotide thereto. The electrodes of the array were then re-exposed to a **liquid** comprising 1 mM mercapto hexanol for one hour and rinsed with water to prepare, at the surfaces of the deprotected electrodes, a stable phase capable of supporting hybridization to the thiol-terminated oligonucleotides. The steps of deprotecting one or more electrodes and attaching a thiol-terminated oligonucleotide were terminated oligonucleotide had been formed at the surface of each electrode within the array. The modified array may be exposed to a **liquid** comprising oligonucleotides at least partially complementary to the thiol-terminated electrodes of the electrode array. Hybridization between a thiol-terminated electrode and a partially complementary oligonucleotide may be determined by monitoring an electrical characteristic, such as a **capacitance** of each electrode within the array. Thus, the modified electrode array may be used to determine the presence of a several of polynucleotides.

L56 ANSWER 4 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2003-802623 [75] WPIX Full-text
DNN N2003-643296 [75]
TI Multi **nozzle dispensing** head, has primary and secondary **nozzles** with internal bore, where secondary **nozzles** have **dispensing** tip in which aggregate resistance to **flow** in all bores is greater than that in split channel
DC X25
IN **MAKAROV S; OSING J; SHVETS I**; SWEENEY D
PA (MAKA-I) MAKAROV S; (OSIN-I) OSING J; (SHVE-I) SHVETS I; (SWEE-I) SWEENEY D
CYC 1
PIA US 20030175163 A1 20030918 (200375)* EN 22[11] <--
ADT ~~US 20030175163~~ A1 **US 2002-98393 20020318**
PRAI **US 2002-98393 20020318**
AB US 20030175163 A1 UPAB: 20050601

NOVELTY - The head (1) has primary and secondary **nozzles** (2, 4) with an internal **nozzle** bore connected adjacent to their proximal ends. A manifold (3) connected to the primary **nozzle** forms an internal split channel for reception of **liquid** from the primary bore. Each secondary **nozzle** has a **dispensing** tip (5) in which resistance to **flow** in all the **nozzle** bores is greater than resistance to **flow** in the split channel.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a multi **nozzle dispensing** assembly.

USE - Used for **dispensing** assemblies that **dispense** small **volumes** (10 microlitres or less) of **liquids.**

ADVANTAGE - The head is capable of **dispensing** four, eight, twelve or even more **droplets** simultaneously and ensures that the variation in the **volumes** of the **droplets dispensed** from the separate channels is small. The **dispensing** head can be easily disconnected and replaced. DESCRIPTION OF DRAWINGS - The drawing shows a view of a **dispensing** assembly.

Dispensing head (1)
Primary **nozzle** (2)
Manifold (3)
Secondary **nozzles** (4)
Dispensing tips (5)
Dispensing assembly (10)

L56 ANSWER 5 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2003-579199 [55] WPIX Full-text

DNC C2003-156990 [55]
DNN N2003-460383 [55]
TI Detection of smallest quantities and **flows** of fluids by continuous **droplet** size determination, useful in a medicinal drip unit, employs **capacitative** measurement to control oscillator frequency
DC A85; B07; S02; S03
IN AUGE J; DIERKS K; HENNING B; PRANGE S
PA (AUTO-N) INST AUTOMATION & KOMMUNIKATION EV MAGDE
CYC 1
PIA DE 10162055 A1 20030626 (200355)* DE 8[4] <--
DE 10162055 B4 20070412 (200727) DE
ADT DE 10162055 A1 **DE 2001-10162055 20011217**
PRAI **DE 2001-10162055 20011217**
AB DE 10162055 A1 UPAB: 20050904
NOVELTY - Determination of smallest quantities and **flows** of fluids, employs a **capacitative** measurement unit.
DETAILED DESCRIPTION - Determination of smallest quantities and **flows** of fluids, employs a **capacitative** measurement unit. Its **conductive**, hollow-cylindrical electrode (3) surrounds the **droplet** (2).
A **second** electrode is a capillary (1) axi-symmetrically above the cylinder. The assembly determines the frequency of an oscillator circuit (4). The **droplet**, growing at the capillary, varies the **capacity** and hence the frequency. An analysis circuit (5) immediately determines the **droplet** size or **volume.**
USE - The method is used to measure **droplet volume** and/or **flowrates.** The apparatus can also be used to measure fluid viscosity (claimed), e.g. in a medicinal drip unit.
ADVANTAGE - The method is applicable down to very small **flowrates**, below 1 ml/h. It can be extended to larger **flowrates** by **drop** counting and/or using units in parallel. **Droplet** size is measured continuously during its formation, using comparatively low-cost equipment. Prior art **droplet** imaging methods are costly by comparison, require image analysis facilities and determine **droplet** size less precisely.
DESCRIPTION OF DRAWINGS - The figure shows a semi-pictorial schematic diagram illustrating the basic principles of measurement. (Drawing includes non-English language text). Capillary (1)
Droplet (2)
Hollow-cylindrical electrode (3) Oscillator circuit (4)
Analysis circuit (5)
TECH
POLYMERS - Preferred Components: The tubular electrode and/or the capillary is coated with an insulating layer, preferably Teflon (RTM; polytetrafluoroethylene).
ELECTRONICS - Preferred Components: The main oscillator circuit oscillates at 1 MHz or more and is LC-, RC- or crystal-controlled. The HF oscillator output is mixed with that of a reference oscillator, facilitating measurement at a lower frequency, the beat frequency.
Further measurement circuitry is included to take measurements allowing for variation of **capacity** with temperature.
A **droplet** collector is used to determine larger **flows.**
It has a **capacitative** level sensor, in another oscillatory circuit. To extend the measurement range, the number of **droplets** is counted and used to determine the **volume** or **flowrate** of the **liquid.**
The electrode (3) interior is only slightly larger in diameter than the maximum **droplet** size. It partially or entirely surrounds its height, without contacting it. A variant outer electrode is polygonal and may be necked around the **droplet** at the top. The electrode may be perforated or grid-like. Further equipotential electrode configurations

are described. The capillary immersion depth in the surrounding electrode is variable to adjust the basic **capacity** of the assembly, and is selected for reliable oscillator function, even when the **volume** is air-filled. The capillary electrode can be exchanged to suit the **flowrate** or **droplet volume**, as well as its physical characteristics. The surrounding electrode is earthed. The measurement **volume** is shut-off and surrounded by earthed electrical screening, to prevent all forms of interference, including that caused by evaporation and air movements.

L56 ANSWER 6 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2002-723507 [78] WPIX Full-text
DNC C2002-204970 [78]
TI **Liquid droplet dispensing** assembly, e.g. for biomedical applications, detects valve boss movement in main bore and accordingly varies power input to valve boss actuator
DC B04; B07; D16; J04; P42; Q66
IN **MAKAROV S; OSING J; SHVETS A; SHVETS I**
PA (ALLE-N) ALLEGRO TECHNOLOGIES LTD; (MAKA-I) MAKAROV S; (OSIN-I) OSING J; (SHVE-I) SHVETS A; (SHVE-I) SHVETS I
CYC 99

PIA	WO 2002076615	A2	20021003	(200278)*	EN	127[45]	<--
	US 20020177237	A1	20021128	(200281)	EN		<--
	US 6669909	B2	20031230	(200402)	EN		<--
	EP 1379332	A2	20040114	(200410)	EN		<--
	AU 2002251437	A1	20021008	(200432)	EN		<--
	EP 1379332	B1	20051102	(200574)	EN		
	DE 60207062	E	20051208	(200581)	DE		
	AU 2002251437	A8	20051020	(200615)	EN		
	DE 60207062	T2	20060803	(200651)	DE		

ADT WO 2002076615 A2 **WO 2002-IE39 20020326**; US 20020177237 A1 **US 2001-816326 20010326**; US 6669909 B2 **US 2001-816326 20010326**; AU 2002251437 A1 **AU 2002-251437 20020326**; AU 2002251437 A8 **AU 2002-251437 20020326**; DE 60207062 E **DE 2002-607062 20020326**; EP 1379332 A2 **EP 2002-720415 20020326** ; EP 1379332 B1 **EP 2002-720415 20020326**; DE 60207062 E **EP 2002-720415 20020326**; EP 1379332 A2 **WO 2002-IE39 20020326**; EP 1379332 B1 **WO 2002-IE39 20020326**; DE 60207062 E **WO 2002-IE39 20020326**; DE 60207062 T2 **DE 2002-607062 20020326**; DE 60207062 T2 **EP 2002-720415 20020326**; DE 60207062 T2 **WO 2002-IE39 20020326**
FDT DE 60207062 E Based on EP 1379332 A; EP 1379332 A2 Based on WO 2002076615 A; AU 2002251437 A1 Based on WO 2002076615 A; EP 1379332 B1 Based on WO 2002076615 A; DE 60207062 E Based on WO 2002076615 A; AU 2002251437 A8 Based on WO 2002076615 A; DE 60207062 T2 Based on EP 1379332 A; DE 60207062 T2 Based on WO 2002076615 A
PRAI **US 2001-816326 20010326**
AB WO 2002076615 A2 UPAB: 20060202
NOVELTY - The assembly includes a metering valve (2) connected to a pressurized **liquid** delivery source. The valve includes a valve boss (15) movable within a main bore (3) to **dispense liquid** through a **nozzle** (6) on the valve base (5). A detector (25) detects the boss movement, and a controller accordingly varies the power input to a valve boss actuator.
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for **liquid droplet dispensing** method.
USE - For **dispensing** and aspirating small **volumes** of **liquid** for biomedical applications e.g. drug development, medical diagnostics, combinatorial

chemistry techniques, genomics, microarraying and proteomics in biotechnology, instrumentation development in printing technology, etc.
ADVANTAGE - Provides an accurate and improves method that is capable of **dispensing droplets** ranging between 10 nl and 10 microliter, without much boss bouncing by using the boss movement detector.
DESCRIPTION OF DRAWINGS - The figure shows a side sectional view of the **dispensing** assembly.
Metering valve (2)
Main bore (3)
Valve base (5)
Nozzle (6)
Valve boss (15)
Detector (25)

L56 ANSWER 7 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **2002-500193** [53] WPIX Full-text
DNC **C2002-141637** [53]
DNN **N2002-396052** [53]
TI **Drop** size measurement system in intravenous drip chamber, includes **capacitor** and **volume** determining system that measures change in **capacitance** as fluid **drop** moves through **capacitor**
DC B07; P34; S02; S05
IN BARNES C W; BARNES W C; BARTZ B J; BROWN H; GRIER M J; KALER C G; LOVELL M S; BARNES C
PA (ALAR-N) ALARIS MEDICAL SYSTEMS INC; (MICT-C) MICROSOFT CORP; (CARD-N) CARDINAL HEALTH 303 INC
CYC 98

PIA							
WO 2002040084	A2	20020523	(200253)*	EN	24[3]	<--
AU 2002033925	A	20020527	(200261)	EN		<--
US 6562012	B1	20030513	(200335)	EN		<--
EP 1335765	A2	20030820	(200362)	EN		<--
JP 2004513710	W	20040513	(200435)	JA	44	
EP 1335765	B1	20050907	(200559)	EN		
DE 60113292	E	20051013	(200568)	DE		
US 20050240640	A1	20051027	(200571)	EN		
DE 60113292	T2	20060119	(200612)	DE		
CA 2429409	C	20070116	(200707)	EN		
AU 2002233925	B2	20060824	(200708)	EN		

ADT WO 2002040084 A2 **WO 2001-US42969 20011120**; US 6562012 B1 **US 2000-717437 20001120**; US 20050240640 A1 Cont of **US 2000-717437 20001120**; CA 2429409 C **CA 2001-2429409 20011120**; DE 60113292 E **DE 2001-613292 20011120**; DE 60113292 T2 **DE 2001-613292 20011120**; EP 1335765 A2 **EP 2001-984921 20011120** ; EP 1335765 B1 **EP 2001-984921 20011120**; DE 60113292 E **EP 2001-984921 20011120**; DE 60113292 T2 **EP 2001-984921 20011120** ; EP 1335765 A2 **WO 2001-US42969 20011120**; JP 2004513710 W **WO 2001-US42969 20011120**; EP 1335765 B1 **WO 2001-US42969 20011120**; DE 60113292 E **WO 2001-US42969 20011120**; DE 60113292 T2 **WO 2001-US42969 20011120**; CA 2429409 C **WO 2001-US42969 20011120**; AU 2002033925 A **AU 2002-33925 20011120** ; JP 2004513710 W **JP 2002-542453 20011120**; US 20050240640 A1 US 2005-171768 20050630; AU 2002233925 B2 **AU 2002-233925 20011120**
FDT DE 60113292 E Based on EP 1335765 A; DE 60113292 T2 Based on EP 1335765 A; US 20050240640 A1 Cont of US 6562012 B; AU 2002033925 A Based on WO 2002040084 A; EP 1335765 A2 Based on WO 2002040084 A; JP 2004513710 W Based on WO 2002040084 A; EP 1335765 B1 Based on WO 2002040084 A; DE 60113292 E Based on WO 2002040084 A; DE 60113292 T2 Based on WO 2002040084 A; CA 2429409 C Based

on WO 2002040084 A; AU 2002233925 B2 Based on WO 2002040084 A
PRAI **US 2000-717437 20001120**
US 2005-171768 20050630
AB WO 2002040084 A2 UPAB: 20060120
NOVELTY - Fluid **drop** measurement system (10) includes plates (42) that form a **capacitor** (16), and a **volume** determining system (18). The plates are positioned on either side of a predetermined path so that the fluid **drop** passes between them. The **volume** determining system measures the change in **capacitance** as the fluid **drop** (30) moves through the path, based on the change in **capacitance.**
DETAILED DESCRIPTION - Measurement system (10) comprises two plates (42) that form a **capacitor** (16) and a **volume** determining system (18) connected to the **capacitor.** The plates are separated by and positioned on either side of a predetermined path so that a fluid **drop** (30) passes between the plates as it moves through the path, thus changing the **capacitance.** The **volume** determining system measures the change in **capacitance** as the fluid **drop** moves through the path. It determines the **volume** of the fluid **drop** based on the amount of change of **capacitance** between the two opposing plates. An INDEPENDENT CLAIM is included for a method for determining the **volume** of a fluid **drop** using the above system comprising positioning the plates across the predetermined path, measuring the change in the **capacitance** as the fluid moves through between the plates, and determining the **volume** of the fluid **drop** based on the change of the **capacitance.**
USE - Used for measuring fluid **drop** size in an intravenous drip chamber.
ADVANTAGE - The apparatus accurately measures the rate of **flow** of infusion medication for a patient. It is easy to manufacture and easy to use. It directly measures the **volume** of each **drop**, eliminating the disadvantage of assuming a **drop** size or shape.
DESCRIPTION OF DRAWINGS - The figure shows an apparatus for controlling the **flow** of fluid to a patient. Measurement system (10)
Drip chamber (12)
Capacitor (16)
Volume determining system (18) Control device (20, 22)
Drop (30)
Plates (42)
Resonant circuit (44)
TECH
MECHANICAL ENGINEERING - Preferred Components: The **volume** determining system comprises a resonant circuit (44) having a resonance frequency determined by the **capacitor** and an oscillator having a frequency of oscillation determined by the **capacitor.** The system also integrates the individual determined **volumes** of fluid **drops** on a selected period, and provides a **volume** per unit time signal. The apparatus also includes a drip chamber between the opposing plates, a display connected to the determining circuit, a memory for storing rate of fluid **flow**, a processor connected to the memory and a **flow** control device (20, 22) responsive to **flow** signal of fluid **drops.**
The drip chamber (12) provides a predetermined path, so that the fluid falling to it changes the **capacitance.** The display receives the **volume** per unit time signal and displays a fluid **flow** rate based on the **volume** per unit time signal. The processor compares the stored rate of fluid **flow** to the **volume** per unit time signal. The change in **capacitance** of the two plates will result in a proportional change of the resonance frequency of the resonant circuit.

L56 ANSWER 8 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2002-091528 [13] WPIX Full-text
CR 2001-452948

DNC C2002-028418 [13]
DNN N2002-067423 [13]
TI **Dispensing** assembly for use with **liquid droplets** comprises delivery device for forming **liquid droplets** and for causing the **droplets** to fall off
DC B07; D16; J04; P42; S02
IN **MAKAROV S; OSING J; SHVETS I**
PA (ALLE-N) ALLEGRO TECHNOLOGIES LTD
CYC 25
PIA EP 1099483 A1 20010516 (200213)* EN 79[50] <--
ADT ~~EP 1099483~~ A1 **EP 2000-650123 20000904**
PRAI **EP 1999-650106 19991111**
AB EP 1099483 A1 UPAB: 20050706

NOVELTY - A **dispensing** assembly comprises a **dispenser** having a **nozzle** bore terminating in a **dispensing** tip. A delivery device is provided for moving **liquid** to the **dispenser** to form **droplets** and causing the **droplets** to fall off. The delivery device has a separate pressurized **liquid** delivery source and the **dispenser** is a metering device.

DETAILED DESCRIPTION - A **liquid droplet dispensing** assembly comprises a **dispenser** having a main bore communicating with a **nozzle** having a **nozzle** bore terminating in a **dispensing** tip. A delivery device is provided to move the **liquid** to the **dispenser** and from there through the bore to form a **droplet** on the exterior of the tip and then to cause the **droplet** to fall off. The delivery device comprises a separate pressurized **liquid** delivery source for moving pressurized **liquid** to the **dispenser** (40). The **dispenser** is a metering valve **dispenser** and comprises an elongate body (41) having a base (49) including a valve seat (43) which forms an entrance to the **nozzle** (44). The **dispenser** also includes a valve boss (47) in the main bore (42) having cross-sectional area which is less than that of the main bore. The predetermined area is provided to permit free passage of **liquid** by passing the valve boss and devices for altering the relative positions of the valve boss and the valve seat between an open position with the valve boss spaced-apart from the valve seat and a closed contact position sealing the valve seat and spaced-apart from the base. An INDEPENDENT CLAIM is also included for a method of **dispensing** a **droplet** having a **volume** less than 10 microL from a pressurized **liquid** delivery source through a metering valve **dispenser.**

USE - For **dispensing** micro-**volumes** of **liquid droplets** useful in printing applications.

ADVANTAGE - The invention is capable of **dispensing volumes** of **liquid** as small as less than or equal to 10 nL - 10-8 L, while at the same time it can also be used to **dispense** larger **droplets** such as those as large as greater than or equal to 10 microL. The quantity of the fluid **dispensed** can be freely selected by the operator and accurately controlled by the **dispensing** system. It is also capable of **dispensing** a **drop** of one size followed by a **drop** of a widely differing size, e.g. a 10 nL **drop** followed by a 500 nL one. The part of the **dispenser** that is contaminated by reagents **dispensed** can be simply disconnected and replaced. An accurate delivery of **liquid droplets** to a correct target is achieved. The problems of operation of the conventional solenoid valve are improved.

DESCRIPTION OF DRAWINGS - The figure shows a diagrammatic view of a **dispensing** assembly.

Dispenser (40)
Elongate body (41)
Main bore (42)
Valve seat (43)
Nozzle (44)
Valve boss (47)
Base (49)

TECH

MECHANICAL ENGINEERING - Preferred Components: The valve seat is in the

form of a capillary tube projecting proud of the bases. The valve boss is a floating valve boss of a magnetic material and the device for altering the relative position of thee valve boss and valve seat comprises a separate valve boss actuating assembly adjacent the body. The valve boss is biased to a closed position into engagement with the valve seat by an external magnetic field generated by the actuating coil assembly which comprises two separate sets of coils for moving the valve boss in opposite directions within the body.

The actuating coil assembly also comprises a source of electrical power and controller for varying the current over time as each **droplet** is being **dispensed.** The valve boss actuating assembly comprises a permanent magnet and a device for moving the magnet along the elongate body towards and away from the valve seat. The valve actuating assembly comprises a pair of spaced apart magnetizing assemblies each comprises a coil wrapped around a core and of soft magnetic material.

The valve boss is in the form of an elongate or cylindrical plug having a convex valve seat engaging surface. A stop is mounted in the main bore, i.e., remote from the valve seat, to limit movement of the floating valve boss. The **dispensing** assembly also includes a device for measuring the velocity of the valve boss. The **dispensing** assembly further includes an electrode in the **dispensing** tip, a separate receiving electrode remote from the tip, and a high voltage source connected to one of the electrodes remote from the tip, and a high voltage source connected to one of the electrodes to provide an electrostatic field.

Synchronous indexing devices are provided for the **dispenser** and the receiving electrode for accurate deployment of **droplets** on the substrate. A detector for sensing the separation of the **droplet** from the **dispensing** tip and which comprises a source of electromagnetic radiation, a device for focussing the radiation on the end of the **dispensing** tip, and a device for collecting the radiation transmitted by a **droplet** on the **dispensing** tip. The **dispenser** assembly further includes a bottomless Faraday Pail.

Preferred Apparatus: The valve boss actuating assembly is an electrical coil surrounding the body.

Preferred Properties: The cross-sectional area of the main bore is 50-1500 times greater than that of the **nozzle** bore and/or in the order times that of the **nozzle** bore. The **nozzle** bore diameter has a diameter of 300-75, preferably 200-100 microm.

POLYMERS - Preferred Material: The valve boss is covered with a layer of soft polymer and manufactured from a flexible polymer bonded magnetic material.

METALLURGY - Preferred Material: The body and **nozzle** are made from stainless steel.

L56 ANSWER 9 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 2001-452948 [49] WPIX Full-text
CR 2002-091528
DNN N2001-335349 [49]
TI **Dispensing** assembly, for **liquid droplets** comprising **dispenser** for medical diagnostics, ink jet-printing, etc., has seat-forming entrance to **nozzle** and separate floating valve magnetic boss housed in body member
DC P42; Q66; S02; S05; V02; X25
IN **MAKAROV S; OSING J; SHVETS I**
PA (QUEE-N) QUEEN ELIZABETH COLLEGE DUBLIN
CYC 26
PIA EP 1099484 A1 20010516 (200149)* EN 58[38] <--
US 6713021 B1 20040330 (200423) EN

US 20040101445 A1 20040527 (200435) EN
EP 1099484 B1 20060607 (200641) EN
DE 69931787 E 20060720 (200652) DE
DE 69931787 T2 20070524 (200735) DE

ADT EP 1099484 A1 **EP 1999-650106 19991111**; DE 69931787 E **DE 1999-631787 19991111**; DE 69931787 E **EP 1999-650106 19991111** ; US 6713021 B1 **US 2000-709541 20001113**; US 20040101445 A1 Cont of **US 2000-709541 20001113**; US 20040101445 A1 **US 2003-673408 20030930**; DE 69931787 T2 **DE 1999-631787 19991111** ; DE 69931787 T2 **EP 1999-650106 19991111**

FDT DE 69931787 E Based on EP 1099484 A; DE 69931787 T2 Based on EP 1099484 A

PRAI **EP 1999-650106 19991111**

AB EP 1099484 A1 UPAB: 20060117

NOVELTY - A **dispenser** (40) is a metering valve **dispenser** and includes an elongate body member (41) having a valve seat (43) forming an entrance to a **nozzle** (44). A separate floating valve magnetic boss (47) is housed in the body member (41), whose cross sectional area is less than that of the main bore (42) to permit the free passage of **liquid** bypassing the valve boss (47). A separate valve boss actuating assembly (50,51) is adjacent the body member.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for: (a) a method of **dispensing** a **droplet** having a **volume** less than ten micro liters from a pressurized **liquid** delivery source through metering valve **dispenser.**

USE - As a **dispensing** assembly for **liquid droplets** to form a **droplet** on the exterior of the tip and then to cause a **droplet** to fall off from it, for printing reagents on a substrate covered with bodily fluids for subsequent analysis or alternatively for printing bodily fluids on substrates.

ADVANTAGE - Allows **dispensing** of **volumes** of **liquids** as small as 10 nl or even smaller, while at the same time it should be possible to **dispense** larger **droplets** such as those as large at 10 micro-liters or even greater. The quantity of the fluid **dispensed** can be freely selected by the operator and accurately controlled by the **dispensing** system. Capable of **dispensing** e.g. a 10 nl **drop** followed by a 500 nl one in comparison to for example ink jet printing where the **volume** of one **dispensation** is fixed, and **dispensations** are only possible in multiples of this quantity. DESCRIPTION OF DRAWINGS - The drawing is a diagrammatic view of a **dispensing** assembly.

Dispenser (40)
Elongate body member (41)
Valve seat (43)
Nozzle (44)
Floating valve magnetic boss (47) Valve boss actuating assembly (50,51)

L56 ANSWER 10 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1999-432277 [37] WPIX Full-text
DNN N1999-321850 [37]
TI Method of determining **volume** gas content in two-phase **flow** of unknown **flow** form
DC S02; S03
IN ZUNFT S
PA (DELF-C) DEUT ZENT LUFT & RAUMFAHRT EV
CYC 26
PIA EP 936462 A2 19990818 (199937)* DE 9[5] <--
DE 19806477 C1 19990826 (199938) DE <--
US 6412351 B1 20020702 (200248) EN <--
ADT EP 936462 A2 **EP 1999-102582 19990211**; DE 19806477 C1 **DE 1998-19806477 19980217**; US 6412351 B1 **US 1999-249187 19990212**
PRAI **DE 1998-19806477 19980217**
AB EP 936462 A2 UPAB: 20050521

NOVELTY - The method involves converting the two-phase **flow** into a **droplet** (38) **flow** by causing vortices in the gas and **liquid** (34) phases. The gas content of the **droplet flow** is determined using a **capacitance** measurement technique (30), which involves measuring the permittivity of more than half the **droplet flow.**
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a measurement arrangement for determining a **volume** gas content
USE - For determining a **volume** gas content in a two-phase **flow** of unknown **flow** form.
ADVANTAGE - Highly reliable measurement results can be achieved with a very simple measurement technique . DESCRIPTION OF DRAWINGS - The figure shows a sectional lateral schematic representation of a measurement arrangement. **flow** channel (12)
tube (14)
flow direction (16)
mixer (20)
capacitance measurement arrangement (30) **liquid** phase (34)
drops (38)

L56 ANSWER 11 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1998-231582** [21] WPIX Full-text
DNN **N1998-183386** [21]
TI **Capacitive** fluid level detector for container - uses current drawn by HF oscillator to measure amount of **dielectric** fluid
DC S02; X22
IN BLUSZIS K
PA (BLUS-I) BLUSZIS K
CYC 1
PIA DE 19642026 A1 19980416 (199821)* DE 7[3] <--
ADT DE 19642026 A1 **DE 1996-19642026 19961011**
FDT ~~DE 19642026 A1~~ Add to DE 19601691 A
PRAI **DE 1996-19642026 19961011**
AB ~~DE 19642026 A1~~ UPAB: 20050521
The detector has measurement **capacitor** (3) arranged in the container, such that its **capacitance** changes with the fluid level. The current through the HF oscillator (2) is measured via the voltage across a resistor (4). A reference **capacitor** (9) can be connected to the HF oscillator instead of the measurement **capacitor** by means of two electronic switches (2.11,2.12). A microprocessor controls the switching and displays the results on a LCD (5). The measurement resistor can be connected in series with the DC supply to the electronic switches to measure the voltage **drop.**
USE - For measuring oil level in vehicle engines or oil tanks.
ADVANTAGE - Eliminates effect of temperature drift of DC supply by use of reference **capacitor.**

L56 ANSWER 12 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1998-131625 [13] WPIX Full-text
DNN N1998-103925 [13]
TI Fluid **droplet volume** measuring method for precipitation determination - has each **droplet** electrically charged for measurement of **droplet volume** by detection of **droplet** charge **capacitance.**
DC S02
IN WINDOLPH H
PA (WIND-I) WINDOLPH H
CYC 19
PIA DE 19635348 C1 19980305 (199813)* DE 7[2] <--
WO 9809151 A1 19980305 (199816) DE 22[2] <--

US 20010045126 A1 20011129 (200202) EN <--
US 6439068 B2 20020827 (200259) EN <--
ADT DE 19635348 C1 **DE 1996-19635348 19960831**; WO 9809151 A1 **WO 1997-EP4720 19970829**; US 20010045126 A1 **WO 1997-EP4720 19970829**; US 6439068 B2 **WO 1997-EP4720 19970829**; US 20010045126 A1 **US 1999-147731 19991004**; US 6439068 B2 **US 1999-147731 19991004**
FDT US 6439068 B2 Based on WO 9809151 A
PRAI **DE 1996-19635348 19960831**
AB DE 19635348 C1 UPAB: 20050520
The **droplet volume** measuring method has a fluid **volume** divided into individual **droplets** which are provided with an electrical charge, which is dependent on the potential difference and the **capacitance** of the **droplets** relative to the background.
The **volume** of each **droplet** is determined by measuring the **capacitance** by conversion into a corresponding voltage, detected as a voltage variation upon the **droplet** striking an electrode held at the background potential.
USE - For **droplet** regulated pressure infusion apparatus.
ADVANTAGE - Accurate measurement of **volume** of individual **droplets** via respective **capacitance** values.

L56 ANSWER 13 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1996-221621 [22] WPIX Full-text
DNN N1996-186057 [22]
TI **Capacitance** probe for fluid **flow** and volume measurements especially for measuring urine **flow** in persons on spacecraft missions - has electrodes with fluid **flowing** between them with reflection signal being transmitted to detection circuit and responsive to permittivity of fluid.
DC S02; S03
IN AENDT G D; ARNDT G D; CARL J R; NGUYEN T X
PA (USAS-C) NASA US NAT AERO & SPACE ADMIN
CYC 1
PIA US 400703 A0 19960215 (199622)* EN 35[6] <--
US 5596150 A 19970121 (199710) EN 3 <--
ADT US 400703 A0 **US 1995-400703 19950308**
PRAI **US 1995-400703 19950308**
AB US 8400703 N UPAB: 20060110
The **capacitance** probe measures the **flow** volume of a material within a **flow** stream. The probe has two parallel elongated electrodes spaced apart by an amount dependent on the size of a **droplet** of the fluid being measured. A signal generator produces a reference signal for the probe. A cable applies the reference signal to the probe and **conducts** a reflection signal to detection circuitry that is responsive to the permittivity of the fluid **flow** stream and produces an analogue permittivity signal. A **conductance** probe is also provided to give more accurate **flow** volume data in response to **conductivity** of the material in the **flow** stream. An analogue **conductivity** signal is generated. Both analogue signals are converted to digital signals which provide an output related to the **flow** of material within the **flow** stream.
USE/ADVANTAGE - To determine e.g. amount of salt in solution, monitoring fluids with close permeabilities e.g. two oils, volume fractions of immiscible fluids, detecting impurities in water etc. - Reliable and accurate.

L56 ANSWER 14 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1991-030056** [05] WPIX Full-text
DNN **N1991-023227** [21]
TI Measuring level of electrically **conducting liquid** -

has measuring of infusion **liquid** or blood from change in
capacitance of electrodes in measurement **liquid**

DC P34; S02; S05
IN POLASCHEGG H D
PA (FREP-C) FRESENIUS E CHEM PHARM
CYC 1
PIA DE 3923079 A 19910124 (199105)* DE <--
DE 3923079 C 19911219 (199151) DE [3] <--
ADT DE 3923079 A **DE 1989-3923079 19890713**; DE 3923079 C **DE 1989-3923079 19890713**
PRAI **DE 1989-3923079 19890713**
AB DE 3923079 A UPAB: 20050430
The level of an electrically **conducting liquid** is determined from the **capacitance** change of a **capacitor** containing two electordes. The wall of the container holding the **liquid** is a **dielectric** which determines the **capacitance.** The electrically **conducting liquid** (15) forms one of the electrodes whose change in area is evaluated. The other electrode (5) is mounted outside the container and extends over the entire possible fill height.
USE/ADVANTAGE - For accurate simple measurement of the level of infusion **liquid** and blood in medical applications, especially in an infusion spray pump **drop** chamber and especially of small quantities.

L56 ANSWER 15 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1991-000559** [01] WPIX Full-text
DNC **C1991-000255** [21]
DNN **N1991-000456** [21]
TI Measuring **liquid flow** rate - by counting **drops** and processing data from counting sensor
DC J04; S02; T06; X27
IN FLESSENKEM T
PA (FARH-C) HOECHST AG
CYC 1
PIA DE 3919859 A 19901220 (199101)* DE <--
ADT DE 3919859 A **DE 1989-3919859 19890619**
PRAI **DE 1989-3919859 19890619**
AB DE 3919859 A UPAB: 20050430
A unit (6), which can be flangedly mounted on a recipient vessel or pipe, has an internal feeder (1), with an open end through which fell **drops** of **liq** from a feeder coupled to an external supply source.
The falling **drops** are counted by an inbuilt sensor (5) of known type, eg. with a sensitive mechanical switch, **capacitative** or optical. The **drop** rate is converted by an external computer into total **flow** rates, pref. in the range 0.1-20.0 ml/min. Incoming material, esp if viscous, may be heated by a sleeve (18), which therefore also permits supply of molten material. USE/ADVANTAGE - Used for supplying analytical chemical reagents or **liquid** detergent/additives with washing machines. Provides precise readings, and detects **flow** rate variation.

L56 ANSWER 16 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1990-180416 [24] WPIX Full-text
DNC C1990-078267 [21]
DNN N1990-140228 [21]
TI Impedance cross correlation logging tool for use in borehole - for determining at least one characteristic of the discontinuous phase two-phase **liquid** circulating around the tool.
DC H01; Q49; S03; X25
IN LUCAS G
PA (SLMB-C) SCHLUMBERGER LTD; (SLMB-C) SOC PROSPECTION ELEC SCHLUMBERGER

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CYC  7
PIA  EP 372598      A  19900613 (199024)* EN            <--
     NO 8904817     A  19900625 (199031)  NO            <--
     GB 2227841     A  19900808 (199032)  EN            <--
     CA 2002584     A  19900603 (199034)  EN            <--
     US 4975645     A  19901204 (199051)  EN            <--
     GB 2227841     B  19930512 (199319)  EN   0[1]     <--
     EP 372598      B1 19941214 (199503)  EN   18[7]    <--
     DE 68920010    E  19950126 (199509)  DE            <--
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ADT EP 372598 A **EP 1989-202782 19891106**; GB 2227841 A **GB 1988-28271 19881203**; GB 2227841 B **GB 1988-28271 19881203**; DE 68920010 E **DE 1989-68920010 19891106**; EP 372598 B1 **EP 1989-202782 19891106**; DE 68920010 E **EP 1989-202782 19891106** ; US 4975645 A **US 1989-440008 19891121**

FDT DE 68920010 E Based on EP 372598 A

PRAI **GB 1988-28271 19881203**

AB EP 372598 A UPAB: 20050430

The tool can be used to measure the volume fraction or the **volume flow** rate of the discontinuous or dispersed phase in oil/gas by suspending downhole.
Pref. comprises three main cylindrical sections (24), (26), and (28, joined in axial alignment by two intermediate non-**conductive** sections (32) and (34) and terminating at the lower extremity in a nose section (30). The assembly is centralised in the borehole by means of stabilising fins on section (24).
Running axially through the tool'is wiring duct (36) carrying screened cables connecting the electrodes (38), (52) and (53) of measurement sections 26 and 28 and sensors (60) and (62) of section (34) to the electrode section (24).
Void fraction measuring section (26) has a first set of eight electrodes (38)equi-spaced radially around its axis. A **second** and third identical set of (8) electrodes (48) and (50) respectively, similarly equi-spaced as electrodes (3() above, form the cross correlation velocity measurement section (28). All electrodes of the three sets of eight are aligned along the sameme generatrices of the tool.
ADVANTAGE - Valid measurements can be made, even in boreholes deviated from the vertical, with an accuracy which has not been obtd. before this method.
The method could also be used to measure the **flow** rate of any other phase such as water or solids distributed in separate or **droplets** in a continuous medium of a non - **conducting** fluid. @(14pp Dwg.No.1/7)@

L56 ANSWER 17 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

AN **1990-083178** [11] WPIX Full-text

TI low level monitoring method for **liquid** dropper - detects remaining quantity of **liquid** by using variations of electrostatic **capacity** occurring between two electrodes

DC S02; W05

IN SUZUKI T

PA (TOPL-N) TOHO PLASTIC CO; (TOPL-N) TOHO PLASTIC CO LTD

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CYC  1
PIA  US 4896099     A  19900123 (199011)* EN   8[10]    <--
     US 34073       E  19920922 (199241)  EN   7[10]    <--
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ADT US 4896099 A **US 1988-284040 19881214**; US 34073 E **US 1988-284040 19881214**; US 34073 E **US 1991-637572 19910103**

FDT US 34073 E Reissue of US 4896099 A

PRAI **JP 1988-30591 19880210**

AB US 4896099 A UPAB: 20060106

The low level monitoring method comprises the steps of applying a pulse of a stable level to at least one of detecting electrodes attached to an outer surface of a lower portion of a **liquid**-containing dropper. A level of the pulse passed through an interior of the dropper is compared with a reference pulse level. The reference pulse level is between a level of the pulse passed

through the interior of the dropper when the **liquid** exists for defining an electrostatic **capacity** between the detecting electrodes and that of the pulse passed through the interior of the dropper when a remaining quantity of the **liquid** in the dropper decreases to such an extent that a significantly reduced electrostatic **capacity** is defined between the detecting electrodes.
An annunciator is automatically actuated when a judgement signal representative of unfavourable results derived from the stop of comparing with the reference pulse level.

L56 ANSWER 18 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1984-237329** [38] WPIX Full-text
TI **Capacitance** sensor for **liquid** level detection - has variable delay circuits and phase discriminating circuit which output measured information
DC S01; S02
IN KATO R
PA (KATO-I) KATO R
CYC 2
PIA US 4470008 A 19840904 (198438)* EN 9[10] <--
CA 1182188 A 19850205 (198510)# EN <--
ADT US 4470008 A **US 1982-394836 19820702**; CA 1182188 A **CA 1982-406520 19820702**
PRAI **US 1982-394836 19820702**
AB US 4470008 A UPAB: 20050421
The sensor comprises a pulse generating circuit; a number of variable delay circuits, each including as a component a variable **capacitance** transducer and adapted to delay a pulse from the pulse generating circuit by a time lag corresponding to a **capacitance** value of the transducer and then output the thus-delayed pulse. A phase discriminating circuit is adapted to discriminate a phase difference of the pulses output respectively from the variable delay circuits and then output measured information.
USE/ADVANTAGE - Can be used to measure various parameters. The **capacitance** sensor is particularly effective as a **liquid** level detection sensor for **liquid** containing bottles used to **dispense** intravenous substances in **drop**-wise fashion. It is not required for the above sensor to reset its detectable threshold for the above sensor to reset its detectable threshold level for every material or item to be measured, because unnecessary variables such as temperature changes and **dielectric** constant changes of the material or item are cancelled out. The present **capacitance** sensor can be reduced in size, weight and fabrication cost. It is also capable of detecting very small changes in **capacitance.**

L56 ANSWER 19 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1983-D8255K [12] WPIX Full-text
TI **Capacitive** level sensor for fuel tanks - contains reference **capacitor** chamber and pump eliminating water collection errors
DC S02; X22
IN KOBAYASHI H
PA (NSMO-C) NISSAN MOTOR CO LTD
CYC 3
PIA DE 3229874 A 19830317 (198312)* DE 16 <--
GB 2105473 A 19830323 (198312) EN <--
US 4479116 A 19841023 (198445) EN <--
GB 2105473 B 19850724 (198530) EN <--
DE 3229874 C 19870521 (198720) DE <--
ADT DE 3229874 A **DE 1982-3229874 19820811**; GB 2105473 A **GB 1982-23201 19820812**; US 4479116 A **US 1982-408704 19820816**
PRAI **JP 1981-133340 19810827**

AB DE 3229874 A UPAB: 20060104
The level measurement device eliminates inaccuracies caused by water gathering between the plates or electrodes. It can also indicate the quantity of impurities, e.g. water, in the fuel, and can detect separation of benzine-alcohol mixtures into separate layers. A pump inside the tank completely fills a chamber (33) containing several parallel reference electrodes (34) also parallel to the direction of **flow** of the **liquid** through the chamber. Alternate electrodes are connected together to form a **capacitor** whose **capacitance** varies with the **dielectric** constant of the medium. The measurement and reference electrodes are connected to the level evaluation circuit.

L56 ANSWER 20 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1982-F1403E [18] WPIX Full-text
TI Fuel gauge for motor vehicle - has **capacitor** partially immersed in fuel so that its **capacitance** varies with fuel level
DC S02; X22
IN KOBAYASHI H
PA (NSMO-C) NISSAN MOTOR CO LTD
CYC 3

PIA	GB 2086054	A	19820506	(198218)*	EN	10	<--
	DE 3133017	A	19820513	(198224)	DE		<--
	GB 2086054	B	19840830	(198435)	EN		<--
	US 4531407	A	19850730	(198533)	EN		<--

ADT ~~GB 2086054~~ A GB **1981-23846 19810804**; US 4531407 A **US 1983-563273 19831219**
PRAI **JP 1980-146445U 19801016**
AB GB 2086054 A UPAB: 20050421
The fuel gauge includes a stationary **capacitor** (10) located within a fuel tank (11) in such a manner as to be partially immersed in the fuel so that the **capacitance** of the **capacitor** varies with the level of fuel (28). In order to obviate the effects of water **droplets** (33) on the **capacitance** of the **capacitor**, the size of the gap between **capacitor** plates (10) is such that (i.e. 2.5-4mm) water **droplets** (33) suspended in the fuel spend the least possible time between the plates. A measuring device comprising; oscillator (22) counting circuit (40) and indicator (41) determines the time averaged **capacitance** of the **capacitor** to measure the level of the fuel (28) or the amount of fuel remaining in the tank.

L56 ANSWER 21 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN 1982-B1706E [05] WPIX Full-text
TI Suspended moisture **capacitive** flux meter - has **capacitor** ring with perforated plate catching **liquid droplets** and altering **capacitance**
DC S02
IN POPOV N V; SMIRNOV B K; SOLOVEVA I I
PA (LEKA-C) LENGD KALININ POLY
CYC 1
PIA SU 823867 B 19810423 (198205)* RU 3 <--
ADT SU 823867 B **SU 1976-2435906 19761230**
AB SU 823867 B UPAB: 20050421
Meter is suitable for humidity measurement and has advantage of possible use for measurement in **volumes** with variable velocities. This is achieved by the use of outer **capacitor** ring in the form of perforated ring and the inner plate is supplementarily fitted with centring elements made in the form of hermetic separating cylinders with the possibility of axial displacement and rotation around the axis. Moisture **droplets** carried by gas stream or **droplets** carried by atomised jet, pass through the perforated plate of unit (2) into measuring space (5). Due to aerodynamic resistance of the holes, the **droplets** cannot

come from the measuring space back to the stream. The moisture, having filled with **volume** of space (5), changes the **capacitance** of the **capacitor.**
The time necessary for the change of **capacitance** determines the **flow** of the moisture **droplets.** After the end of measurement, electrode (3) is lowered down and turned through 180 degs. The centring element (8) covers the receiver and element (6) opens the moisture drain hole. In order to create excess pressure in the measuring space, air is applied via hole (4). Bul.15/23.4.81

L56 ANSWER 22 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1975-F2972W** [20] WPIX Full-text
TI Non-**conductive liquids** level measmt. - using measuring and compensating **capacitors** and two-output operational amplifier
DC S02
PA (HEAT-R) HEAT POWER INSTR
CYC 1
PIA SU 435459 A 19741203 (197520)* RU <--
ADT SU 435459 A **SU 1972-1862818 19721227**
AB SU 435459 A UPAB: 20050416
Increased accuracy and reliability are obtained by making the transducer (2) from three parts, each contng. gate (K - K3). In the absence of **liquid** the **capacity** of (1) is equal to the (C1) and the output of the amplifier (3) is equal to the stabilized power supply output but opposite in polarity. The resistances (R1-R3) and when the pulses from generator (4) close the gates (K1-K3) charging current **flows** to the three networks. When there is **liquid** in the measuring section (1-1') the **capacity** of the transduces rises linearly in proportion to the **liquid** level. This causes a corresponding current rise in the charging network and voltage **drop** across the resistor (4). Any errors introduced by varying parameters of the measured **liquid** are eliminated by the compensation transducer (1').

L56 ANSWER 23 OF 23 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
AN **1974-36080V** [19] WPIX Full-text
TI **Liquid drops** automatic **dispenser** - the falling **liquid drop** shorts two needle electrodes which control the **drop** counter
DC J04; S02
PA (ALMA-N) ALMA ATA CAST MECH FAC
CYC 1
PIA SU 393594 A 19731224 (197419)* RU <--
ADT SU 393594 A **SU 1971-1684602 19710727**
AB SU 393594 A UPAB: 20050414
Automatic measurement and **flow** stabilization are obtained by placing two electrodes in the path of the falling **drops.** Each **drop** shorts the electrical path between the needle electrodes thus completing a circuit to the control valve grid. The valve can operate any number of electrical components including a relay and a counter which can be used for **dispensing** 'triethanololine' (sic]) fed to shaft cementation furnace. The **dispensed liquid flows** into cylinder and via a hole into the pipe of the shaft cementation furnace in the form of **drops.** The **drops** fall between the two needle electrodes closing the circuit to the grid of the valve. This operates a relay whose contact connects the **capacitor** to a resistor which counts the number of **drops** .

=> d his

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     (FILE 'HOME' ENTERED AT 14:34:59 ON 11 JUN 2007)
                SET COST OFF

     FILE 'WPIX' ENTERED AT 14:35:19 ON 11 JUN 2007
L1        37617 S ?DROPLET?
L2       120197 S ?DROP
L3        45998 S ?DROPS
L4       177793 S L1-L3
L5         1467 S L4 AND B05B001/IPC,IC,ICM,ICS
L6         3869 S L4 AND B05B/IPC,IC,ICM,ICS
L7        15275 S L4 AND ?NOZZL?
L8        17396 S L5-L7
L9          828 S L4 AND (B11-C03 OR C11-C03)/MC
L10         818 S L4 AND R760/M0,M1,M2,M3,M4,M5,M6
L11       18148 S L8-L10
L12         203 S L11 AND G01F/IPC,IC,ICM,ICS
L13      163717 S L4 AND (PD<=20040227 OR PRD<=20040227 OR AD<=20040227)
L14        1752 S L13 AND G01F/IPC,IC,ICM,ICS
L15          38 S L14 AND ?CAPACITANC?
L16           2 S L15 AND L11
L17          36 S L15 NOT L16
L18           1 S L16 NOT BATH?
L19          37 S L17,L18
L20          16 S L19 AND ?CAPACITOR?
L21          11 S L19 AND ?DIELECTR?
L22          13 S L19 AND ?CAPACITI?
L23          24 S L20-L22
L24          13 S L19 NOT L23
L25           6 S L24 AND L1
L26           7 S L24 NOT L25
L27           4 S L23 AND L1
L28          20 S L23 NOT L24-L27
                SEL DN AN 1-3 8 15
L29           5 S L28 AND E1-E10
L30         102 S L14 AND ?CAPACIT?
L31          64 S L30 NOT L15-L29
L32           3 S L31 AND L1
L33          61 S L31 NOT L32
                SEL DN AN 27 29 59 60
L34           4 S L33 AND E1-E16
L35          19 S L25,L27,L29,L34
                E SHVETS/AU
L36         134 S E4-E17,E43-E50
                E MAKAROV/AU
                E MAKAROV S/AU
L37         210 S E3-E18
                E OSING/AU
L38           7 S E9
                E FRANKEN/AU
L39           7 S E12-E14
L40         343 S L36-L39
L41           1 S L40 AND G01F/IPC,IC,ICM,ICS
L42          11 S L40 AND B01L/IPC,IC,ICM,ICS
L43           5 S L40 AND B05B/IPC,IC,ICM,ICS
L44           4 S L40 AND (B11-C03 OR C11-C03)/MC
L45           4 S L40 AND R760/M0,M1,M2,M3,M4,M5,M6
L46           6 S L40 AND R530/M0,M1,M2,M3,M4,M5,M6
L47           2 S L40 AND (B11-C08B OR C11-C08B)/MC
L48          12 S L41-L47
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L49          13 S L40 AND L4
L50          19 S L48,L49
L51          11 S L50 AND L13
                SEL DN AN 6-11
L52           5 S L51 NOT E1-E12
L53          23 S L35,L52
L54          23 S L53 AND L1-L53
L55          23 S L54 AND (?NOZZL? OR ?CAPACIT? OR ?DIELECTR? OR DI ELECTR? OR
L56          23 S L55 AND (G01F OR B01L OR B05B)/IPC,IC,ICM,ICS

     FILE 'WPIX' ENTERED AT 15:25:10 ON 11 JUN 2007

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